a review of Formal exponential map for graded manifolds by Liao, Hsuan-Yi; Stienon, Mathieu

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Formal exponential map for graded manifolds. (English) Zbl 07130853

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The principal objective in this paper is to introduce, for every $\mathbb{Z}$-graded manifold, a formal exponential map in a purely algebraic way and investigate its properties with applications. Although the geodestic exponential map $\exp : T_M \to M \times N$ associated to an affine connection ∇ on a smooth manifold M fails to transpose straightforwardly to the graded manifold context, its fiber-wise infinite-order jet evaluated along the zero section of T_M admits a genuinely algebraic description carrying over to the $\mathbb{Z}$-graded context. It is established (Theorem 4.3) that the formal exponential map $\mathrm{pbw} : \Gamma(S(T_M)) \to \mathcal{U}(T_M)$ is an isomorphism of filtered coalgebras over $\mathcal{C}^\infty(M)$. As applications, a much more transparent proof of the Emmrich-Weinstein theorem [*C. Emmrich* and *A. Weinstein*, Prog. Math. 123, 217–239 (1994; Zbl 0846.58031)] for graded manifolds and a proof based on homological perturbation of an analog of *V. Dolgushev*'s result in [Adv. Math. 191, No. 1, 147–177 (2005; Zbl 1116.53065)] using *B. V. Fedosov*'s iterative method [J. Differ. Geom. 40, No. 2, 213–238 (1994; Zbl 0812.53034)] in the context of $\mathbb{Z}$-graded manifold are given.

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